



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/584,313

08/11/2006

Shinichiro Isobe

2006_1029A

9079

513

7590

01/06/2010

WENDEROTH, LIND & PONACK, L.L.P.

1030 15th Street, N.W.,

Suite 400 East

Washington, DC 20005-1503

EXAMINER

YANG, JAY

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

01/06/2010

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/584,313	Applicant(s) ISOBE, SHINICHIRO	
	Examiner JACK YANG	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) 2 and 3 is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☐ Claim(s) 1 and 4-9 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>11/20/09</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

1. This Office Action is in response to the amendments/arguments filed September 02, 2009.

Response to Amendment

1. The rejection of Claims 5 and 6 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention is overcome by amendment.

2. The rejection of Claim 1 under 35 U.S.C. 102(b) as being anticipated by Okada (JP 2003-217856 A) is overcome by amendment.

3. The rejection of Claim 2 under 35 U.S.C. 103(a) as being unpatentable over Okada (JP 2003-217856 A) in view of Hong et al. (Synthetic Metals 82 (1996) 189-191) is overcome by cancellation of the claim.

4. The rejection of Claim 3 under 35 U.S.C. 102(a) and 102(e) as being anticipated by Li et al. (US 2004/0219387) is overcome by cancellation of the claim.

5. The rejection of Claims 4 and 6 are rejected under U.S.C. 103(a) as being unpatentable over Okada (JP 2003-217856 A) in view of Tashiro et al. (US 5,059,863 A) is overcome by amendment.

6. The rejection of Claim 5 under 35 U.S.C. 103(a) as being unpatentable over Okada (JP 2003-217856 A) in view of Mataga et al. (JP 2003-133072 A) is overcome by amendment.

Art Unit: 1794

7. The rejection of Claim 7 under 35 U.S.C. 103(a) as being unpatentable over Okada (JP 2003-217856 A) in view of Tashiro et al. (JP 2000-282024 A) is overcome by amendment.
8. The rejection of Claim 8 under U.S.C. 103(a) as being unpatentable over Okada (JP 2003-217856 A) in view of Ishida et al. 92003-157977 A) is overcome by amendment.
9. The rejection of Claim 9 under U.S.C. 103(a) as being unpatentable over Okada (JP 2003-217856 A) in view of Nakatsuka et al. (JP 2003-151778 A) is overcome by amendment.

Claim Rejections – 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

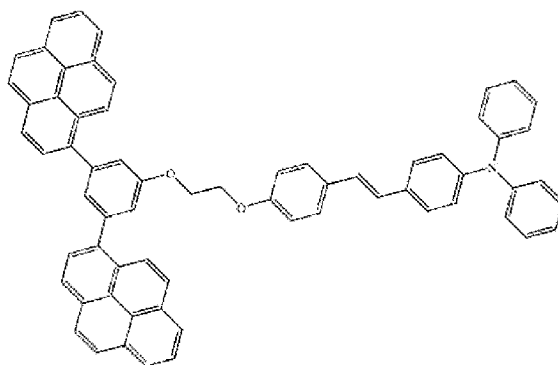
(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

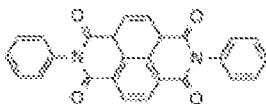
3. Claims 1-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 2004/0219387 A1) in view of Ishii et al. (IEEE Journal of Selected Topics in Quantum Electronics, Vol. 4, No. 1, January/February 1998).

Li et al. discloses an organic EL device comprising an emission layer (103, Fig. 1) that comprises a compound of the formula $H_0-(X-(R)_m-X-G)_n$ ([0024]) where $X = O, S$, $R =$ alkyl group, $G =$ chromophore, and $H_0 =$ conjugated chromophore with hole-transporting or electron-transporting properties ([0034]). Li et al. discloses the following embodiment:



((ii), page 4) such that $L = A_1-R_1-A_2$ where $R_1 =$ alkylene group (ethylene), $A_1 =$ heteroatom (oxygen), and $A_2 =$ ether group and $Y =$ polycyclic aromatic compound (substituted pyrenyl phenyl). However, Li et al. does not disclose $X =$ naphthalenediimide nor phenyldiimide group.

Ishii et al. discloses the following electron-transporting (page 25) compound:



(DP-NTCI, page 26) for use in organic EL devices (abstract). It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the

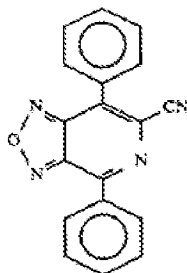
Art Unit: 1794

above naphthalenediimide compound for the charge-transporting component (substituted styryl group) in the embodiment disclosed by Li et al. ((ii), page 4). The motivation is provided by the fact that the naphthalenediimide is a known electron-transporting compound used in organic EL devices, in addition to the fact that Li et al. discloses that H_0 is preferably a conjugated chromophore that has electron-transporting properties with polycyclic fused groups ([0034]-[0035]), which renders the substitution predictable with a reasonable expectation of success.

4. Claims 4 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 2004/0219387 A1) in view of Ishii et al. (IEEE Journal of Selected Topics in Quantum Electronics, Vol. 4, No. 1, January/February 1998) and Tashiro et al. (US 5,059,863 A).

Li et al. in view of Ishii et al. discloses the organic EL device according to Claim 1 as shown above. However, Li et al. in view of Ishii et al. does not disclose that Y = oxa(thia)diazolopyridine derivatives as disclosed in the claims.

Tashiro et al. discloses the following organic luminescent compounds:



(col. 7, (9)) as material for the organic luminescent layer such that $R_1 = R_2 = \text{phenyl}$.

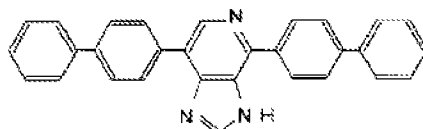
Tashiro et al. further discloses that the cyanide group can be replaced by hydrogen (col.

2, lines 14-15). It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the light-emitting compound as disclosed by Tashiro et al. for the substituted pyrenyl phenyl light-emitting component in the compound in the organic EL device as disclosed by Li et al. in view of Ishii et al. The motivation is provided by the fact that the light-emitting compound as disclosed by Tashiro et al. exhibits high luminance even at a low driving voltage (col. 1, lines 44-45), in addition to the fact that Li et al. discloses that G = conjugated chromophores having at least one nitrogen and heteroaromatic rings ([0036]), which renders the substitution predictable with a reasonable expectation of success.

5. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 2004/0219387 A1) in view of Ishii et al. (IEEE Journal of Selected Topics in Quantum Electronics, Vol. 4, No. 1, January/February 1998) and Mataga et al. (JP 2003-133072 A).

Li et al. in view of Ishii et al. discloses the organic EL device according to Claim 1 as shown above. However, Li et al. in view of Ishii et al. does not disclose Y = imidazole derivative as disclosed in the Claim.

Mataga et al. discloses the following compound:



([0066], (17)) as a light-emitting element in an organic EL device such that Y = carbon atom (no substituent) and C = D = phenyl. It would have been obvious to one of

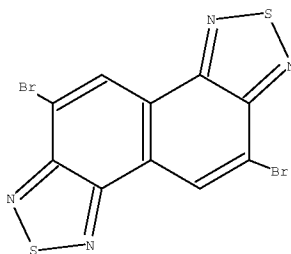
Art Unit: 1794

ordinary skill in the art at the time of the invention to substitute the light-emitting compound as disclosed by Mataga et al. for the substituted pyrenyl phenyl light-emitting component in the compound in the organic EL device as disclosed by Li et al. in view of Ishii et al. The motivation is provided by the fact that the light-emitting compound as disclosed by Mataga et al. is an identified light-emitting compound that can be effectively used in organic EL devices, in addition to the fact that Li et al. discloses that G = conjugated chromophores having at least one nitrogen and heteroaromatic rings ([0036]), which renders the substitution predictable with a reasonable expectation of success.

6. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 2004/0219387 A1) in view of Ishii et al. (IEEE Journal of Selected Topics in Quantum Electronics, Vol. 4, No. 1, January/February 1998) and Tashiro et al. 2 (JP 2000-282024 A).

Li et al. in view of Ishii et al. discloses the organic EL device according to Claim 1 as shown above. However, Li et al. in view of Ishii et al. does not disclose Y = thiadiazole derivative as disclosed in the Claim.

Tashiro et al. 2 discloses the following compound:



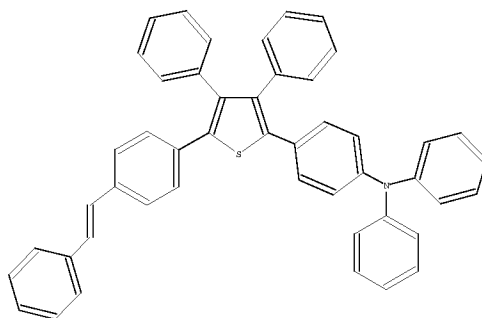
Art Unit: 1794

(Table 1) as a strong fluorescent dopant in the organic electron-transporting layer (ETL) and/or the hole-transporting layer (HTL) ([0029]) such that $X = \text{Br}$ and $R_1 = R_2 = \text{a hydrogen atom}$. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the light-emitting compound as disclosed by Tashiro et al. 2 for the substituted pyrenyl phenyl light-emitting component in the compound in the organic EL device as disclosed by Li et al. in view of Ishii et al. The motivation is provided by the fact that the light-emitting compound as disclosed by Tashiro et al. 2 is an identified light-emitting compound that can be effectively used in organic EL devices, in addition to the fact that Li et al. discloses that $G = \text{conjugated chromophores having at least one nitrogen and heteroaromatic rings}$ ([0036]), which renders the substitution predictable with a reasonable expectation of success.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 2004/0219387 A1) in view of Ishii et al. (IEEE Journal of Selected Topics in Quantum Electronics, Vol. 4, No. 1, January/February 1998) and Ishida et al. (JP 2003-157977 A).

Li et al. in view of Ishii et al. discloses the organic EL device according to Claim 1 as shown above. However, Li et al. in view of Ishii et al. does not disclose $Y = 2,3,4,5\text{-tetraphenylthiophene derivative}$ as disclosed in the Claim.

Ishida et al. discloses the following compound:

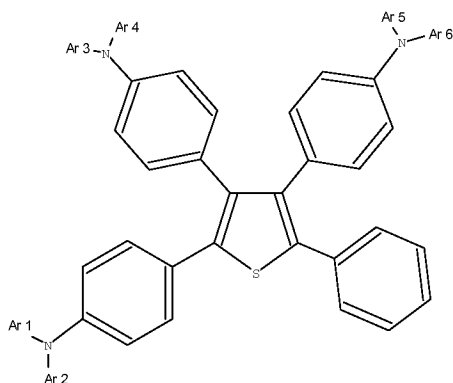


(A-1) to use as light-emitting element in an organic EL device such that $R_{12} = R_{14} =$ hydrogen, $R_{13} =$ phenyl, $Ar_1 = Ar_2 =$ phenyl, $Y_1 = Y_2 =$ hydrogen. It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the light-emitting compound as disclosed by Ishida et al. for the substituted pyrenyl phenyl light-emitting component in the compound in the organic EL device as disclosed by Li et al. in view of Ishii et al. The motivation is provided by the fact that the light-emitting compound as disclosed by Ishida et al. is an identified light-emitting compound that can be effectively used in organic EL devices, in addition to the fact that Li et al. discloses that $G =$ conjugated chromophores having at least one nitrogen and heteroaromatic rings ([0036]), which renders the substitution predictable with a reasonable expectation of success.

8. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (US 2004/0219387 A1) in view of Ishii et al. (IEEE Journal of Selected Topics in Quantum Electronics, Vol. 4, No. 1, January/February 1998) and Nakatsuka et al. (JP 2003-151778 A).

Li et al. in view of Ishii et al. discloses the organic EL device according to Claim 1 as shown above. However, Li et al. in view of Ishii et al. does not disclose Y = 2,3,4,5-tetraphenylthiophene derivative as disclosed in the Claim.

Nakatsuka et al. discloses the following compound:



(1) where Ar₁-Ar₅ = aryl group as a light-emitting element in an organic EL device ([0043]). It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the light-emitting compound as disclosed by Nakatsuka et al. for the substituted pyrenyl phenyl light-emitting component in the compound in the organic EL device as disclosed by Li et al. in view of Ishii et al. The motivation is provided by the fact that the light-emitting compound as disclosed by Nakatsuka et al. is an identified light-emitting compound that can be effectively used in organic EL devices, in addition to the fact that Li et al. discloses that G = conjugated chromophores having at least one nitrogen and heteroaromatic rings ([0036]), which renders the substitution predictable with a reasonable expectation of success.

Response to Arguments

1. Applicant's arguments filed on September 02, 2009 have been fully considered but they are not found to be persuasive.
2. The applicant argues on page 10 that Li et al. does not explicitly teach the combination of a charge-transporting group X that is a naphthalenediimide group or a phenyldiimide group. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In addition, the applicant further states that Li et al. does not disclose Y represented by the specific compounds recited in Claim 1. This is not true since as stated in the rejection Li et al. discloses a pyrenyl substituted phenyl light-emitting group as chromophore ((ii), page 4).
3. The applicant argues on page 10 that Li et al. discloses a dopant-host system in which the dopant of the form $H_0-(X-(R)_m-X-G)_n$ is used in combination with a host material in the light-emitting layer ([0026]) of an organic EL device in contrast to the isolated use of $(Y-L)_nX_m$ w/o host material as disclosed in the present application. However, this argument does not address the fact that Li et al. in combination of Ishii et al. (and others) meets all the limitations of the claim(s).
4. The applicant states that the present invention has superior light-emitting properties in contrast to the reference. The applicant needs to provide evidence for this assertion.

Art Unit: 1794

3. Applicant's arguments with respect to Claims 1-9 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

1. Applicant's amendment necessitated the new ground(s) of rejections presented in this Office Action. According, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JACK YANG whose telephone number is (571)270-1137. The examiner can normally be reached on Monday to Thursday from 8:30 am to 6:00 pm Eastern.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, D. Lawrence Tarazano can be reached on (571)272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1794

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1794

/J. Y./
Examiner, Art Unit 1794